NOTES ON THE ANTS OF LUQUILLO FOREST, PUERTO RICO (HYMENOPTERA: FORMICIDAE)[1,2]

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ABSTRACT—Distribution records and ecological notes are presented for 34 species of ants found in Luquillo Forest, Puerto Rico. Feeding on ants by lizards of the genus *Anolis* and frogs of the genera *Eleutherodactylus* and *Leptodactylus* is recorded.

In the process of examining the stomach contents of frogs occurring in the Luquillo Experimental Forest in northeast Puerto Rico, I encountered the remains of several different species of ants. Upon examining the literature, I found that while most of the island had been fairly extensively surveyed for ants, none of the previous investigators had had the opportunity of penetrating the tropical wet forest. Wheeler (1908) obtained sufficient material in a month to describe several new species and to provide ecological data. A single species was described by Mann (1920) and more were added to our taxonomic knowledge of the ants of the island by Wheeler (1934). After spending a year gathering ecological data on the ants of the western half of the island, Smith (1936) summarized the available information and described one new species. Mention of only two species, *Camponotus ustus* Forel and *Myrmelachista ramulorum* Wheeler, was made by Martorell (1945) in his two volume work on Puerto Rican forest insects. Wolcott (1948) summarized the information provided by the previous investigators, emphasizing the importance of ants in the diets of *Anolis* lizards. A partial list of the ants occurring in the vicinity of El Verde Field Station, Luquillo Forest was prepared by Drewry (1970) as part of a list of insects of that forest. During the course of the work herein reported, Smith and Lavigne (1973) described a new species of *Paratrechina* from Luquillo Forest as well as a new species of *Tapinoma* from Mariecao Forest.

Luquillo Experimental Forest is a tropical montane forest with an annual rainfall of between 279 and 330 cm. Elevations within the forest vary from approximately 400 m at the lowest elevation to 1065 m on El Yunque Peak. The terrain near El Verde Field Station (elev. 455 m) in the tabonuco forest, where the majority of observa-

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tions were made, consists of numerous fingerlike ridges, with small valleys between. As many as 256 different species of plants may occur in a single acre. Trees are tall and the upper story canopy may reach a height of 25 m. Litter decomposition is rapid and litter buildup is minimal resulting in a very shallow layer of debris except in depression type situations. The soil in the area contains a high proportion of clay and soil water infiltrates almost vertically, although when it reaches denser soil it flows downslope. As would be expected, well-drained soil occurs on the top of the ridges and poorly drained at the bottom (Puerto Rico Nuclear Center Ann. Rept. 119; Personal communication with Dr. George Drewry).

Four vegetation zones have been described for Luquillo Forest. Beginning with the highest elevations they are (1) the mossy forest, in which the trees rarely exceed 5 m and are covered with hanging moss, (2) the palm forest, (3) the Colorado forest, in which the dominant species is *Cyrilla racemiflora* L. and (4) the tabonuco forest, where the dominant tree is *Dacryodes excelsa* Vahl. Only five species of ants were found in the mossy forest: *Strumigenys rogeri* Emery, *Paratrechina* sp. near *vividula* (Nylander), *Iridomyrmex melleus* Wheeler, *Hypoponera ergatandria* (Forel), and *Trachymesopus stigma* (Fabricius). With the exception of *Hypoponera ergatandria*, these ant species occur throughout the forest. Nine additional species appear in the palm forest (elev. 793 m–915 m): *Anochetus mayri* Emery, *Strumigenys gundlachi* (Roger), *Myrmelachista ramulorum*, *Brachymyrmex heeri* Forel, *Paratrechina steinheili* (Forel), *Macromischa isabellae* Wheeler, *Solenopsis azteca pallida* Wheeler, *S. corticalis* Forel, and *S. geminata* (Fabricius). The Colorado forest was not extensively penetrated but is believed to contain all the forest species listed except for possibly *Hypoponera ergatandria*. All species, except *H. ergatandria* were collected within the tabonuco forest. More extensive collecting should show that *H. ergatandria* occurs in other parts of the forest unless it arrived in the mossy forest transported by air currents or automobiles.

Distribution data for the ant species were obtained by three methods (a) observation, (b) dissection of frog stomachs, and (c) establishment of tunafish bait stations.

Observations on the habits of ants were conducted from the end of November, 1969, to the end of August, 1970, incidental to the main project of determining the feeding habits of frogs in relation to niche diversity. Frogs were collected in the forest at all hours of the night and immediately after capture were injected with Turtox Insect Preservative, using a hypodermic syringe. Injected into the stomachs, the preservative acted to halt the action of stomach acids. Frogs

were identified either in the field or immediately upon returning to the laboratory. They were then stored in Turtox Insect Preservative until such time as the digestive tracts could be removed and opened. The few lizards collected during the daylight hours were treated in the same fashion.

With the exception of *Leptodactylus albilabris* (Guenther), all the frogs collected belonged to the genus *Eleutherodactylus* and were *coqui* Thomas, *antillensis* (Rheinhard and Leutken), *brittoni* Schmidt, *portoricensis* Schmidt, *richmondi* Stejneger, *hedricki* Rivero, *eneidae* Rivero, *wightmannae* Schmidt, *locustus* Schmidt, *gryllus* Schmidt, *karlschmidti* Grant, *unicolor* Stejneger, *cooki* Grant and *cochranae* Grant. *Eleutherodactylus cooki* is restricted to the Panduras mountain range of southeastern Puerto Rico and *E. cochranae* is restricted to the coastal plains. The lizards dissected all belong to the genus *Anolis* and were *evermanni* Stejneger, *stratulus* Cope, *gundlachi* Peters, and *krugii* Peters.

The species of ants which were subjected to the most intense predation by *Eleutherodactylus* frogs in Luquillo Forest were *Pheidole moerens* Wheeler, *Wasmannia auropunctata* (Roger) and *Iridomyrmex melleus* Wheeler. It is probable that these species are the most abundant ants in the vicinity of El Verde Field Station. General observations support this contention.

In order to ascertain that all scavenger ants in the vicinity of El Verde Field Station had been discovered and to attempt to assign activity periods to certain species, a series of 22 stations was established along a forest trail at 8 am on August 11, 1970. These stations were baited with tunafish and hourly counts of ants were made at the stations over the following 24 hours. The bait was replaced as needed. There was some indication that some species were able to force other species to relinquish their positions at individual bait stations. For example, in one case *Pheidole moerens* workers disappeared from the bait at the same hour that *Paratrechina cisipa* Smith and Lavigne workers began to appear in numbers. In three other cases, upon the appearance of *Paratrechina microps* (Smith) workers, the *P. moerens* workers disappeared, whereas at station 6 where no *Paratrechina* species appeared, *P. moerens* workers were active all night. The *P. moerens* workers would then appear in the morning at whatever time the nocturnal species disappeared. At one station, it was observed that *Iridomyrmex melleus* workers maintained a position on the perimeter of the bait station while *Solenopsis corticalis* workers were feeding on the bait, and at another these *corticalis* workers were observed "fending off" *Pheidole flavens sculptior* workers. At two other stations *Solenopsis azteca* workers were "holding off" a ring of *Wasmannia auropunctata* workers. Experiments

should be conducted to establish this tendency of forest ants to compete for available food.

Based on general observation and data obtained from the bait stations, it appears that all the forest Formicinae, with the possible exception of *Myrmelachista ramulorum* and *Paratrechina steinheili*, are nocturnal. Among the Dolichoderinae, only *Tapinoma litorale* Wheeler and among the Myrmicinae, only *Pheidole flavens sculptior* Forel, appear to be primarily nocturnal. All members of the forest Ponerinae forage singly in the litter, and although *Odontomachus* sp. and *Hypoponera ergatandria* were taken at tunafish bait only at night, the observations made are insufficient to establish a trend.

MYRMICINAE

Strumigenys eggersi Emery: The only specimens of *S. eggersi* collected by the author in Luquillo Forest were dissected from the stomachs of four juvenile frogs (*Eleutherodactylus portoricensis*) collected near El Verde Field Station, but Drewry (1970) had previously listed it from this locale, taken on sticky traps in the forest.

Strumigenys rogeri Emery: This species occurs commonly in the lower reaches of Luquillo Forest. Workers were also dissected from the stomachs of *Eleutherodactylus locustus* males, females and juveniles collected in the mossy forest on the slopes of El Yunque Peak (elev. 1000 m). No specimens of any species of *Strumigenys* were taken at tunafish bait stations. Workers of *S. rogeri* were only observed foraging at night and, even then, deep within the litter. On two occasions, several workers were collected from inside the dehisced seed coats of *Guarea trichilioides* L.

Three colonies were located and were all nesting within individual decaying *Cecropia peltata* L. pith chambers lying in the forest litter. The colony collected on November 16 contained 1 queen, 2 eggs, 12 larvae, 2 pupae, 105 workers and 2 winged reproductives. That on December 11 contained 3 queens, 1 egg, 14 larvae, 3 pupae and 8 workers (one newly emerged). The colony collected on March 24th contained 2 queens, 18 eggs, 29 larvae, 20 pupae and 53 workers. In this latter colony was also a large female lacking wing scars. One side of this latter chamber contained a "trash" pile of insect parts. Two coccids were also found in this chamber.

Based on the number of amphibians consuming this ant, it would appear that *Strumigenys rogeri* is fairly well distributed in Luquillo Forest occurring at all elevations. Workers were collected from the stomachs of the lizards *Anolis gundlachi*, *A. krugii* and the frogs, *Eleutherodactylus coqui*, *E. portoricensis*, *E. richmondi*, *E. wightmannae*, *E. eneidae*, *E. brittoni* and *E. locustus*.

Additionally, workers were found in the stomachs of *E. cochranae*

females and *E. coqui* juveniles collected in a wet pasture 2 miles east of Rio Grande, near the coast.

Strumigenys gundlachi (Roger): I did not encounter foraging workers of this ant species in Luquillo Forest but specimens were dissected from the stomachs of *Eleutherodactylus coqui, E. portoricensis, E. richmondi, E. wightmannae* and *E. eneidae* collected at lower elevations in the forest. Workers were also found in the stomachs of some juvenile *E. brittoni* collected in the Palm forest on El Yunque (elev. 755 m). Workers of *Strumigenys gundlachi* were also collected from the litter in Maricao Forest.

Cyphomyrmex rimosus minutus Mayr: At lower elevations in Luquillo Forest, workers were occasionally observed during the daylight hours foraging in the forest litter. In one instance workers were observed "working" a decaying fruit of *Brysonima coriacea* and on another occasion a single worker was observed carrying an unidentified piece of vegetation. According to Smith (1936), their food consists of "yellowish, pear-shaped bodies of fungus", and Weber (1955) has shown that this species cultivates fungus gardens.

No colonies were discovered but on May 27, a single female winged reproductive was found, along with 17 workers, inside a decaying hollow seed in the litter of Maricao Forest (Rte 120:Km 10, H1).

Workers were collected in Luquillo Forest from the stomachs of the frogs, *Eleutherodactylus coqui, E. richmondi* and *E. antillensis*, and that of the lizard, *Anolis krugii.*

Mycocepurus smithi Forel: This fungus ant is recorded as nesting in small colonies in red clay soil, the entrance being "more or less obscured by the earth thrown over and around it" (Smith, 1936).

Nine workers were observed on the morning of December 29 in the vicinity of El Verde Field Station; they were busily engaged inside the seed coat of *Paullinia pinnata* L. decaying on the forest floor. Other than these, the only individuals seen were collected from the stomachs of frogs representing four species of *Eleutherodactylus*, namely *coqui, portoricensis, richmondi* and *wightmannae.* Frogs of the first two species were all juveniles and those of the last two species, males. These stages of these frogs forage primarily in the litter, indicating where colonies of these ants probably nest in Luquillo Forest.

Additional unpublished Puerto Rican records for this species are as follows: Near Sabana Grande (Rte 2:Km 16, H3), V-28-70, in soil; Maricao Forest (Rte 120:Km 10, H2), V-27-70, in litter on trail.

Wasmannia auropunctata (Roger): This small yellowish orange ant, commonly called the "albayalde" by the natives, is one of the most common of all Puerto Rican ants found "from El Morro at San

Juan to the tops of the mountains" (Wolcott, 1948). Its sting has made the worker ant notorious and coffee plantations have been abandoned because of the natives' refusal to work in the same area as the ant. This species was common at lower elevations in Luquillo Forest.

This species is primarily diurnal as indicated by observations made over a 10 month period. At two tunafish bait stations, they were only present during the daylight hours. However, in late February, workers were observed crawling across litter at 10:15 pm and at bait site #1; workers were constantly present from 11 am one day until 9 am the following morning.

Workers have been observed carrying insect parts, whole dead insects, working decaying fruits of *Guarea trichilioides, Manilkara balata bidentata* (A., DC.) Cher. and *Dacryodes excelsa* Vahl. in the forest litter. In the Maricao Forest they were collected tending *Pseudococcus maritimus* (Ehrhorn) inside the hollow fruit of *Calophyllum brasiliense* Camb. in the litter.

A winged reproductive was taken from the stomach of an *Anolis krugii* female collected on March 3 in Luquillo Forest. Both male and female reproductives were found in sections of 2 nests in hollowed-out fruits of *Calophyllum brasiliense* in the forest litter on May 27, 1970, in the Maricao Forest.

In Luquillo Forest, only one populus colony of several hundred individuals was encountered located within a decaying log. In all other instances apparently only portions of colonies were discovered. The number of ants in these "cells" varied from 1,903 workers, 307 larvae and 38 pupae to 18 workers, 3 larvae and 52 pupae, but never was a queen present in these gatherings. Workers caring for larvae and pupae and occasionally eggs were often encountered in the seed pods of *Inga vera* Willd., inside the seed coat of *Dacryodes excelsa* seeds, inside the partly dehisced seed coats of *Sloanea berteriana* Choisy and between two wet leaves in the litter. This leads me to theorize that, in the absence of suitably large quarters, this ant species is able to maintain disjoint nests with only tenuous communication with the queens.

Workers of *Wasmannia auropunctata* were found in the stomachs of the lizards, *Anolis gundlachi, A. krugii, A. stratulus* and *A. evermanni*. Additional workers were dissected from the stomachs of the frogs, *Eleutherodactylus coqui, richmondi, wightmannae, antillensis* and *brittoni*. The last two mentioned frogs occur in the more open areas at the forest edge.

Additional unpublished Puerto Rican records for this species are as follows: Humacao (Rte 3:Km 10, H11), V-25-70, in soil at base of bush; El Verde (Rte 186), VII-6-70, workers tending unidentified

aphids on leaves of tree shoots at the base of a breadfruit tree, *Artocarpus altilis* (Parkinson) Fosberg.

Tetramorium guineense (Fabricius): This is an introduced and tramp species, which has been found most commonly along the seacoast in Puerto Rico.

Drewry (1970) listed it from the forest at El Verde Field Station, but I found only one specimen of this species in Luquillo Forest on the seed coat of a decaying *Dacryodes excelsa* seed lying on the soil. None were dissected from stomachs of either frogs or lizards collected in the forest.

Macromischa isabellae Wheeler: I found portions of two colonies of this brightly colored ant in Luquillo Forest; both colonies were on a forested ridge on El Yunque at an elevation of 753 meters. One colony was found April 20, 1970, within a dead hollowed-out vine of *Clusia krugiana* Urban slightly less than 1 m above the ground. The vine had a diameter of 4 cm at that height. This nest contained 19 workers, 1 winged reproductive, 15 eggs, 35 larvae, 4 worker pupae and 1 reproductive pupa; no queen was found. Additional workers were collected crawling on ferns and tree trunks. Part of another colony was located June 8, within a decaying *C. krugiana* limb at a height of 1⅔ m. Seventeen workers, 8 eggs, 24 larvae and 6 pupae were found in a single chamber, 16 × 7 mm. Additional workers were observed nearby crawling on ferns at a height of 1⅓ m. Dr. Cameron Kepler (personal communication), who was then living in a Forest Service house across the road from the ridge, informed me that he had found colonies consisting of less than 100 workers in the hollow sections of decayed *Cecropia* limbs.

The food of this ant has not been ascertained, but tunafish placed at the tip of the limb housing the second colony attracted several workers. Workers of *Macromischa isabellae* were dissected from the stomachs of *Eleutherodactylus locustus* found in the tall grass in front of Dr. Kepler's residence.

Pheidole subarmata var. *borinquenensis* Wheeler: This form appears to be rare in Luquillo Forest, although Drewry (1970) collected workers on a sticky trap in the vicinity of El Verde Field Station. A portion of only one colony was discovered, consisting of 126 workers and 3 soldiers inside a pod of *Inga vera* lying on the forest floor. The only record of predation was that of a male *Eleutherodactylus portoricensis*, whose stomach contained several workers.

An additional unpublished Puerto Rican record for this species is as follows: Beach at Ensenada Comezon, near Rio Grande, III-3-70, colony in sand.

Pheidole moerens Wheeler: In Luquillo Forest, *P. moerens* is one of the most common ants encountered up to elevations of approxi-

mately 600 m. Workers are consistently found working inside the decaying seed coats of *Dacryodes excelsa* and *Guarea trichilioides*, feeding on the fruits of *Manilkara bidentata* and *Linociera domingensis* (Lam.) Knobl. and working inside the downed seed pods of *Inga fagifolia* (L.) Willd. Steady streams of workers were found at 15 of the 20 tunafish bait stations on August 11 and thus indicate that this species is probably omnivorous.

Most observations indicate that these ants are normally diurnal. Worker activity ceased at most bait stations between 5 and 10 pm, although at one bait site, workers continued to forage throughout the night. Workers reappeared at the bait between 4 and 7 am, usually 6 am.

Portions of colonies containing workers, soldiers, larvae and pupae were found beneath rocks on trails, beneath rocks in the litter and in one instance within the decaying partly dehisced seed coat of *Sloanea berteriana*.

On one occasion *Pheidole moerens* workers were found beneath the decaying roots of a dead *Euterpe globosa* palm in association with a termite colony.

One apparently complete colony was located in a decaying tree limb lying on the forest floor. This limb, opened on June 24, contained a single queen, several hundred larvae and pupae, several hundred workers, 55 soldiers (8 of which were callow), 32 female winged reproductives (6 of which were callow) plus 9 adult colydiid beetles. Several different chambers were used; one frass chamber contained parts of other ant species, primarily *Odontomachus* sp. and *Iridomyrmex melleus*.

Stomach dissections revealed that three species of lizard, *Anolis gundlachi*, *A. stratulus* and *A. evermanni* fed upon *Pheidole moerens* workers. These ants were also present in the stomachs of 9 species of *Eleutherodactylus*, namely *coqui*, *portoricensis*, *richmondi*, *wightmannae*, *eneidae*, *locustus*, *gryllus*, *brittoni*, and *karlschmidti* as well as that of a female *Leptodactylus albilabris*.

Pheidole flavens sculptior Forel: In Luquillo Forest, this species appears to be primarily nocturnal, although one colony was located beneath the concrete patio in front of the laboratory, as a result of following a line of workers one morning. Workers usually began to appear on top of the forest litter at 9 pm. Hourly observations throughout one particular night revealed that their numbers increased until about 3 am and subsequently declined. By 8 am only one worker was still active.

Tunafish bait attracted workers at three sites on August 11. At one site the ants worked the bait from 11 am until 2 pm, at a second, from 8 pm until 4 am and at the third site from 1 pm until 7 am.

An apparently complete colony was found in a decaying *Cecropia peltata* limb on July 23 in the forest litter, which also housed part of a colony of *Iridomyrmex melleus*. The *Pheidole* colony was maintained in the laboratory from that date to August 13 when it was sacrificed. The colony then contained 4 larvae, 27 soldiers, 151 workers and a single queen.

Despite the rarity with which foraging workers of this species were encountered in the forest, they were frequently dissected from the stomachs of the frogs, *Eleutherodactylus coqui, E. portoricensis, E. antillensis, E. brittoni, E. locustus,* and *E. gryllus.* They were also occasionally found in the stomachs of the lizards, *Anolis gundlachi, A. stratulus* and *A. krugii.*

Monomorium floricola (Jerdon): This is a tramp species which was already common in Puerto Rico in the early 1900's (Wheeler, 1908). It apparently has recently invaded Luquillo Forest, since Drewry (1970) collected it on sticky traps within the forest near El Verde Field Station. I did not encounter it within the forest nor was it found in the stomachs of any of the forest frogs or lizards dissected. Neither were any taken at the bait stations. One colony had established itself inside the laboratory, but how the ants originally arrived there is unknown.

Outside the forest, workers of *M. floricola* were abundant in the stomachs of *Eleutherodactylus cochranae* and *E. coqui* collected in a wet pasture 2 miles east of Rio Grande near the coast.

Monomorium carbonarium ebeninum Forel: Although one of the most common ants in Puerto Rico (Smith, 1936; Wolcott, 1948), *M. carbonarium ebeninum* has apparently not yet penetrated Luquillo Forest. However, colonies were located in the yards of houses less than one half mile from the entrance to the forest. None were dissected from the stomachs of either frogs or lizards collected within the forest and none were taken at bait stations. Workers were occasionally found in the stomachs of frogs *Eleutherodactylus cochranae* and *E. coqui* collected in a wet pasture 2 miles east of Rio Grande near the coast.

Solenopsis geminata (Fabricius): This well-known tramp species is commonly found throughout Puerto Rico and the West Indies. Known as the "hormiga brava" by the natives, it is "a vicious, aggressive, stinging ant which normally nests in open sunny places" (Smith, 1936).

This species occurs in Luquillo Forest in open grassy areas created by the construction of roads. It has even been found on the slopes at El Yunque as high as 753 m. Mounds may exceed 30 cm in diameter and are constructed in such a manner that the overlying vegetation is not killed. Workers were often observed at the forest edge working inside the pods of *Inga vera.*

Table 1. Composition of colonies of *Solenopsis azteca* var. *pallida* collected in Luquillo Forest litter.

Date	Eggs	Larvae	Pupae	Workers	Queens
XII–30–69	20	32	4	36	4
I–14–70	?	?	?	41	2
I–14–70	?	?	?	24	2
I–14–70	6	67	17	52	6
I–14–70	77	107	50	78	2
I–14–70	?	?	?	34	4
IV–2–70	5	27	12	26	5
IV–2–70	0	53	17	80	2
IV–2–70	0	25	11	64	3
IV–2–70	28	14	4	18	3

In Luquillo Forest, this ant was dissected from the stomachs of *Anolis gundlachi* as well as from those of the frogs, *Eleutherodactylus coqui* and *E. karlschmidti*. Its absence from the stomachs of the other species of frogs probably reflects its inability to exist in the highly shaded forest environment. Near the coast, in a wet pasture 2 miles east of Rio Grande, workers were collected from the stomachs of the frogs, *E. coqui* and *E. cochranae*.

Solenopsis azteca var. *pallida* Wheeler: Several complete colonies were discovered in Luquillo Forest in the litter, some of them (XII-30-69, I-14-70) within decaying palm nuts (*Euterpe globosa* Gaertn.) and others (IV-2-70) inhabiting the individual hollow pith chambers of rotting limbs of *Cecropia peltata* (Table 1). The number of queens per colony ranged from 2 to 6 while numbers of workers varied from 18 to 80. In one instance 13 workers, 7 larvae and 4 pupae were found between two moist leaves in the leaf litter atop a large boulder in a palm stand.

Workers of this species were collected on various occasions "working" the green rind of *Dacryodes excelsa* fruits and the fruit of *Manilkara balata*. Additionally they have been found working inside the seed pods of *Inga fagifolia* and inside the dehisced seed coat of *Guarea trichilioides* in the forest litter.

Workers were taken visiting four tunafish bait sites on August 11. Since two stations were in the crotches of trees at a height of approximately 2 m, it would appear that these ants are partly arboreal as well as primarily diurnal. At both stations, the first workers appeared at the bait at 5 am and the numbers exceeded 125 at each site within four hours. Since these numbers did not include those in transit and since the figures for colony size presented in Table 1

would indicate that colonies are normally small, it is presumed that more than one colony was represented at each site.

The other two bait sites where these ants were observed were at ground level. At one site, workers first appeared at noon, disappeared between 10–11 pm and reappeared at 3 am; by 7 am their numbers exceeded 200. At the other station, workers appeared at 4 pm, disappeared around midnight only to reappear at 6 am.

This ant is a common inhabitant of the forest. Indicative of this is the high rate of predation especially at lower elevations. Workers were dissected from the stomachs of two lizards, *Anolis gundlachi* and *A. evermanni*, and those of 8 species of *Eleutherodactylus*, namely *coqui*, *richmondi*, *portoricensis*, *wightmannae*, *eneidae*, *antillensis*, *brittoni*, *locustus* and *gryllus*. A female *Leptodactylus albilabris* was collected also which had fed on these ants. Additionally, specimens were recovered from stomachs of *Eleutherodactylus locustus* collected in the palm forest on El Yunque (elev. 753 m).

Solenopsis corticalis Forel: This species was originally described from specimens found by Wheeler (1908) nesting in a stem of a bamboo at Utuado. It was next encountered by Smith (1936) nesting in clay soil in a coffee grove 16 km east of Mayaguez and also attending the pineapple mealybug in a pineapple field near Lajas. Drewry (1970) picked up workers on a sticky trap in the forest in the vicinity of El Verde Field Station. Based upon its observed abundance in Luquillo Forest, it should probably be classified as a true forest inhabitant.

Like its near relative, *S. azteca* var. *pallida*, this species is attracted to sweet substances. Workers have been taken working the decaying fruits of *Guarea trichilioides* and *Sloanea berteriana* in the forest litter. Others have been captured while feeding beneath the seed coat of *Dacryodes excelsa*, inside the dehisced seed coat of *Guarea trichilioides* and inside the seed pods of *Inga fagifolia*. Additionally, workers were collected at eight of the tunafish bait stations on August 11, indicating this species is probably omnivorous.

From observations made within the forest it would appear that this species is normally diurnal. Additionally, workers first appeared at bait stations during the daylight hours in all cases. However, once having appeared, workers were present throughout the night as well, often in numbers as high as 125.

With the exception of one colony found inhabiting a decaying palm nut (*Euterpe globosa*), all other colonies were located inside the hollow pith chambers of decaying limbs of *Cecropia peltata* lying atop the litter. On the average, colonies contained two to three times as many workers, ranging from 7 to 261, as those of *Solenopsis azteca* var. *pallida*. The number of dealated queens was also greater, varying

Table 2. Composition of colonies of *Solenopsis corticalis* collected in Luquillo Forest litter.

Date	Eggs	Larvae	Pupae	Workers	Queens
XII–11–69	77	101	40	113	5
XII–23–69	13	32	9	62	3
III–24–70	344	306	149	183	11
III–24–70	159	184	103	204	11
III–24–70	140	227	90	128	5
III–24–70	86	166	109	236	4
III–24–70	31	68	56	65	4
III–24–70	28	170	125	261	16
III–24–70	7	166	124	150	13
IV–20–70	0	14	2	7	6

from 3 to 16. Although colonies were dissected in December, March, April and July, no winged reproductives were found (Table 2).

Predators of this species include *Anolis stratulus* and *Eleutherodactylus coqui*, *E. portoricensis*, *E. richmondi*, *E. wightmannae*, *E. eneidae* and *E. brittoni*.

Solenopsis sp. (WW): Workers representing this unidentified species appeared in the stomachs of a *Eleutherodactylus coqui* juvenile, a *E. richmondi* male and *E. brittoni* males and juveniles in the forest around El Verde Field Station. It is probably a litter inhabitant like its relatives, since the smaller *E. coqui* juveniles and all stages of *E. richmondi* feed at the litter level.

FORMICINAE

Camponotus ustus Forel: In Luquillo Forest, *C. ustus* workers were encountered on several occasions, but only at night. Workers appeared at two bait stations on August 11 at 8 pm and disappeared at 5 am the following morning. Whenever workers were observed in the forest, they were on the vegetation. Additionally the two tunafish bait sites were in crotches of trees at a height of approximately 2 m indicating that this species is primarily arboreal.

On three occasions portions of colonies of *C. ustus* were found in dead vines of *Clusia krugiana*, 2 to 5 m above the ground in Luquillo Forest on El Yunque at an elevation of 753 m. Portions of another colony were found in a decaying branch of *C. krugiana* lying on the forest floor. What appeared to be a complete colony was located on June 3, 1970, in a dead tree on the forest floor in the same locale. No immatures were counted, but all adults were taken, numbering 257 workers, ranging in size from 5–7 mm, 13 male winged reproductives and one queen. Each limb contained several chambers located

beneath the bark and each chamber had a single entrance to the outside. Occasionally a few chambers, close together, would have a common entrance. Each chamber contained less than 25 workers with a few eggs, larvae and pupae. The eggs are elongate and transparent; the larvae being easily visible inside. Pupae were encased in a white cocoon.

Emergence of reproductives apparently takes place in midsummer. Winged reproductives were observed in flight on a clear night (June 23, 1970) following two weeks of almost steady rain. Additionally, winged males and females were found in the stomachs of a female *Eleutherodactylus portoricensis* and a male *E. coqui* on June 25 and in those of a *E. brittoni* juvenile and a male *E. coqui* on July 16.

Camponotus ustus workers were regularly consumed by *Anolis gundlachi* and *A. stratulus* as well as by *Eleutherodactylus coqui*, *E. portoricensis*, *E. richmondi*, *E. wightmannae* and *E. eneidae*.

An additional unpublished Puerto Rican record for this species is as follows: Bosque Estatal de Guanica (Rte 333, Km 6), V-26-70, climbing trees.

Myrmelachista ramulorum Wheeler: According to Wolcott (1948), *M. ramulorum* is the "only ant of economic importance of all the endemic ants of Puerto Rico." This "hormiguilla," as it is called by the natives has been recorded as nesting from sea level to El Yunque Peak (elev. 1065 m).

Myrmelachista ramulorum workers were occasionally observed in Luquillo Forest. Their secretive habits and arboreal tendencies made them difficult to detect. In one instance workers were encountered in chambers in a 3 m long decaying limb on the forest floor. Individual workers were also found beneath the bark of dead branches of *Clusia krugiana* vines at a height of approximately 5 m in the palm forest (elev. 753 m). Sixty-one workers were found feeding inside a pod of *Inga vera* and on another occasion a line of workers was encountered at noon crawling up and down a cement post which supported a walking bridge across a river in the forest.

On June 23, winged male and female reproductives were collected at a light. Smith (1936) reported that winged males were frequently seen at lights, but not females. He found winged females in a nest on December 13.

That this ant is relatively common in the forest is shown by its abundance in the stomachs of its predators. Three species of forest lizards, *Anolis gundlachi*, *A. stratulus* and *A. evermanni*, feed on them as well as *Eleutherodactylus coqui*, *E. portoricensis*, *E. richmondi*, *E. wightmannae*, *E. eneidae* and *E. gryllus*.

An additional unpublished Puerto Rican record for this species is as follows: Bosque Estatal de Maricao (Rte 120:Km 10, H1), V-27-70, arboreal.

Brachymyrmex heeri Forel: In Luquillo Forest, workers of this minute yellow species have been observed foraging at most hours of the day and night. While most observations have been of those on vegetation up to a height of 4 m above the ground, workers were found in the litter in one instance. Portions of a colony were located on June 8, 1970, in small chambers under a moss covering on dead branches of *Clusia krugiana* vines on El Yunque (elev. 753 m), 2 m above the substrate. Ten winged male reproductives also were found in this nest. Smith (1936) reported finding winged queens in a colony on February 14 and thus indicated the possibility of biyearly swarming.

This ant appears to be accepted quite readily by other ant species. Smith (1936) observed them "attending the hemispherical scale along with workers of *Wasmannia auropunctata*." On more than one occasion I have observed this ant crawling along the midrib of a palm leaf within a column of worker *Iridomyrmex melleus*. Part of a colony was uncovered in a rotting stump which was also being utilized by *Camponotus ustus*.

Brachymyrmex heeri workers were collected at eight of the tunafish bait sites, but none remained more than an hour. One *Pheidole moerens* soldier was encountered with a *B. heeri* worker hanging onto the soldier's antennae by its mandibles.

This species is another very common forest ant and occurs in the diet of both lizards and frogs. All four species of lizards, *Anolis gundlachi*, *A. stratulus*, *A. krugii* and *A. evermanni*, utilize this ant as food, as do *Eleutherodactylus coqui*, *E. portoricensis*, *E. richmondi*, *E. wightmannae*, *E. eneidae*, *E. antillensis*, *E. locustus*, *E. brittoni*, and *E. gryllus*.

Paratrechina longicornis (Latreille): This introduced ant is a house pest throughout Puerto Rico and, at times of heavy rains, may move its entire colony onto interior walls of homes.

So far as is known, this species has not yet invaded Luquillo Forest, although colonies are present in houses bordering the forest. No specimens appeared at the bait stations and none were present in the stomachs of lizards and frogs collected in the forest. Near the coast, two miles east of Rio Grande, workers were found in the stomachs of *Eleutherodactylus coqui* juveniles collected at the edge of wet pasture.

Paratrechina cisipa Smith and Lavigne: This species was described by Smith and Lavigne (1973) from material collected from a colony nesting in a hollow of a living *Roystonea borinquena* tree.

This species is apparently nocturnal as evidenced by the following: (1) Workers have only been found in the stomachs of frogs (nocturnal feeders), not in those of lizards (diurnal feeders), (2)

files of workers have only been encountered at night and (3) visitations to bait sites occurred only between the hours of 7 pm and 7 am.

Workers were encountered in various parts of Luquillo Forest up to an elevation of 760 m at the Vereda Trail on El Yunque. The species appears to be primarily arboreal; files of workers often being seen climbing vertically up trees past the 22 m mark. However, on one occasion approximately 20 workers were discovered between leaves in the litter. When the flashlight passed over them, they retreated into cracks in the soil. Files of workers have also been observed crossing the ground to reach bait stations.

Workers appeared at five tunafish bait stations and as many as 200 workers were counted at individual stations at one time. Once files of workers were established, they continued to work the bait throughout the night. Numbers of workers present dropped rapidly between 4 and 6 am as light began filtering through the canopy.

Attempts were made to follow the files of workers back to their colonies, but after 18 to 23 m, they would disappear beneath the litter. A third file disappeared into a small hole in the bark of a living tree.

Three colonies were located accidentally, one in the hollow of the *Roystonea borinquena* tree previously mentioned, a second inside a rotton log supported 1 to 1½ m above the substrate and a third composed partly of cemented sawdust between the roots of a large tree. In all cases, colonies were large and contained several hundred workers. Winged reproductives were discovered in one colony on July 1.

Workers were found in the dissected stomachs of *Eleutherodactylus coqui*, *E. portoricensis*, *E. wightmannae*, *E. eneidae* and *E. karlschmidti*.

Paratrechina microps (Smith): The description of this endemic Puerto Rican species was based on "4 workers collected from the soil beneath a stone in a rather dense woods and not far from the edge of a stream" 14 km east of Mayaguez. No other specimen of this tiny-eyed ant with six mandibular teeth were recorded as being collected up to January 2, 1970, when I found the remains of some winged reproductives in the stomach of a female *Eleutherodactylus antillensis* frog in the vicinity of an intermittent stream bed in Luquillo Forest.

Subsequently workers were dissected from the stomachs of the frogs, *Eleutherodactylus coqui*, *E. portoricensis*, *E. richmondi*, *E. wightmannae*, *E. antillensis* and *E. karlschmidti* as well as those of the lizards, *Anolis gundlachi* (juveniles) and *A. evermanni* (males and juveniles). All efforts to locate workers in the field were unsuccessful, with the exception of a few workers found under a rock

in a forest trail, until the locations of capture of some calling male frogs were marked. On August 11, tunafish bait placed at three of these sites attracted small numbers of workers. In each case, 30–50 workers appeared from holes in the soil beneath huge boulders lying on the banks of the aforementioned intermittent stream. In one instance, workers were present from 7 pm until 4 am, in another, from 11 pm to 7 am and in a third, from 8 pm to 9 am indicating that this species is primarily nocturnal in habit. Because of the size of the boulders, no attempts were made to excavate colonies of this species.

Paratrechina sp., near *vividula* (Nylander): The identity of *P. vividula* remains open to question. According to Wheeler (1908), he had collected specimens from the mountains surrounding Utuado which agreed with the description of this greenhouse species supplied by Emery who had examined Nylander's types and traced the species to the Americas. However, Smith (1936) did not collect any specimens which he was "positive belong to this species." "Small yellow workers from a nest in the stem of a banana at Maricao were determined as this species by Dr. Wm. Mann" (Wolcott, 1948), and workers collected by Drewry (1970) by hand from the forest in the vicinity of El Verde Field Station were determined as *P. vividula* by Dr. William L. Brown. Specimens which I collected in Luquillo Forest were sent to Dr. D. R. Smith of the U.S. Dept. of Agriculture who determined them to be *Paratrechina* sp., near *vividula*.

Whatever the name, this species is a fairly common inhabitant of Luquillo Forest, although workers were rarely encountered foraging. The majority of colonies or portions of them were found within pith chambers of decaying limbs of *Cecropia peltata* in the forest litter. Part of one colony, which included one winged reproductive female, was located July 15, beneath a root mat atop a large boulder. Workers from another colony had tunneled in clay beneath a large rock, while a portion of a third colony, containing 55 workers, 22 larvae and 1 pupa, was located beneath the dehisced seed coat of a *Sloanea berteriana* seed.

Colonies were small and, within the three which contained queens, only a single queen was discovered (Table 3). Several winged reproductives were found in a colony on April 13 and one male was taken from the stomach of a female *Eleutherodactylus wightmannae* collected on July 16.

Workers appeared in small numbers, not exceeding 30, at six bait stations, none of which were those utilized by *Paratrechina cisipa*. Visitations were primarily nocturnal, although at two sites workers began to appear at 3 pm and continued working throughout the night. In support of a nocturnal habit for these ants, they were

Table 3. Composition of colonies of *Paratrechina*, near *vividula*, taken from pith chambers of *Cecropia peltata* in Luquillo Forest litter.

Date	Eggs	Larvae	Worker pupae	Reproductive pupae	Queen	Winged reproductives	Workers
XII–30–69	4	5	0	0	1	0	5
I–22–70	0	41	1	0	0	0	140
III–24–70	187	131	149	0	1	0	141
IV–13–70	0	274	30	38	0	24	315
VII–2– 70	162	130	122	0	0	0	209
VII–15–70	?*	?*	?*	0	1	1	80–90

*Not Counted

taken only by the night feeding frogs, not by the day feeding lizards. The frogs were *Eleutherodactylus coqui, E. portoricensis, E. wightmannae, E. eneidae, E. brittoni, E. locustus, E. karlschmidti* and *Leptodactylus albilabris.* Some *Eleutherodactylus locustus* frogs containing these ants were collected from the mossy forest on El Yunque Peak (elev. 1000 m).

Paratrechina steinheili (Forel): Despite the fact that I encountered only one worker among the decaying flowers of wild banana on the forest floor in Luquillo Forest, these ants apparently are relatively common since workers were collected from the stomachs of six species of *Eleutherodactylus*, namely *coqui, portoricensis, eneidae, antillensis, brittoni* and *locustus* as well as in those of *Anolis krugii* males, females and juveniles. The *Eleutherodactylus locustus* males and females containing these ants were collected from the palm forest on El Yunque (elev. 753 m) indicating that this species occurs throughout the forest.

A portion of a colony, collected from a rotten log by the Quebrada Sonadora River on August 6, contained 54 workers, 6 male winged reproductives, 2 reproductive pupae, 78 worker pupae and 100 plus eggs and larvae.

DOLICHODERINAE

Iridomyrmex melleus Wheeler: This endemic species is certainly the most commonly observed ant throughout Luquillo Forest and may numerically exceed all others there. Workers could be seen at all times of the day filing up and down tree trunks and across the foliage. Despite their arboreal habit, a few workers found their way to each of 14 ground bait sites and to all three in crotches of trees. In most cases, these ants had disappeared by 9 pm, usually earlier, only to reappear at the bait around 7 am. In one instance, approximately 50 workers discovered the bait between 8 and 9 pm and con-

tinued working it until midnight and then reappeared at 6 am. Tunafish bait scattered on the bank of a roadcut on El Yunque peak (elev. 1000 m) attracted workers of *I. melleus* as late as 10 pm on June 8. One group of workers was noted tending purple aphid nymphs on "Bijao" (*Alpinia aromatica* Aubl. P. Guian). Two workers were observed at noon one day carrying a dead tachinid fly.

Portions of colonies were discovered in various habitats. One aggregation was inhabiting a small hollow in a living tree at a height of 3½ m, while another was living inside a decayed limb which was lying atop of a log. In the mossy forest on a slope of El Yunque Peak (elev. 1000 m), three colonies were discovered inhabiting decaying stems in the crowns of dwarf tree ferns. One group was found colonizing duff between the areal roots of a large tree, while on Monte Britton, 8 workers and 13 larvae were uncovered beneath a rock. One aggregation was found in association with a termite colony inside a decaying palm frond. Two mealybugs were also present.

However, the majority of *Iridomyrmex melleus* colonies were found utilizing the hollow pith chambers of decaying *Cecropia peltata* limbs lying on the forest floor. One colony, which utilized two sections, consisted of 1 queen, 528 eggs, 731 larvae, 5 pupae, 44 callows and 772 workers on December 30. Other colonies were not counted, but in the two instances where queens were found, there was only a single one per colony. Colonies uncovered on July 2 and 10 contained winged male reproductives. Smith (1936) had reported finding winged males and queen pupae in a nest on August 1.

Nearly every species of lizard and frog in Luquillo Forest used this ant for food; i.e., three species of *Anolis*, namely *gundlachi*, *stratulus* and *evermanni*, and ten species of *Eleutherodoctylus*, namely *coqui*, *portoricensis*, *richmondi*, *wightmannae*, *eneidae*, *brittoni*, *locustus*, *hedricki*, *gryllus* and *karlschmidti*. A female *Leptodactylus albilabris* was found to have eaten them as well.

Apparently, in recent years, this ant has been able to expand its distribution beyond the limits of the forest environment. Workers were found in the stomachs of *Eleutherodactylus coqui* juveniles in a wet pasture 2 miles east of Rio Grande near the coast. A colony was located at a 3 m height in a hollow in a live tree at Humaco (Rte 30: Km 2, H4) and workers were collected from a dead limb lying on the soil near by (Rte 30:Km 2, H1). Additionally, one worker was taken from the stomach of a male *E. cooki* Grant collected in a cave formed by boulders on Route 3 just west of Yabucoa.

Tapinoma litorale Wheeler: I did not observe this forest species foraging in Luquillo Forest, but a few specimens appeared in the stomachs of *Eleutherodactylus coqui*, *E. portoricensis*, *E. wightmannae* and *E. eneidae*. Workers were also found in the stomach of

a male *Anolis stratulus*. The single colony located was found in a hollowed-out tree limb. In Maricao Forest, I observed a file of workers on a tree trunk at 10 pm on May 27.

Tapinoma melanocephalum (Fabricius): This tramp species is widely distributed throughout the West Indies where it is a common house pest. It has apparently not invaded Luquillo Forest proper, since no specimens were taken at bait sites or taken from the stomachs of the frogs or lizards. However, workers were collected from a bowl of sugar and feeding on a dead scorpion in a house on El Yunque (elev. 753 m). Also a colony was discovered on the floor beneath the data processing equipment at El Verde Field Station. Winged males and females were found in this colony on May 29. In a house outside the forest, workers were observed filing across an interior wall at 3 am.

Workers were found in the stomachs of males, females and juveniles of both *Eleutherodactylus coqui* and *E. cochranae* collected in a wet pasture, 2 miles east of Rio Grande.

Additional unpublished Puerto Rican records for this ant are as follows: Ensenada Comezon, III-15-70, colony in beach sand beneath coconut; near Guayama (Rte 3:Km 110, H8), V-25-70, inside a decayed coconut.

PONERINAE

Odontomachus sp.: This genus is currently being revised by Dr. W. L. Brown, Cornell University, Ithaca. Consequently it seems best not to designate a species pending the results of his study. During the daylight hours, workers were only encountered in Luquillo Forest when the forest litter was diligently searched. At night on two occasions between 10 and 11 pm, workers were observed foraging on rocks and on the banks of Quebrada Espiritu de Santo, but no colonies were located. On August 11, 1–7 workers were present at each of 4 bait stations from 7 pm through 5 am. At four times during the night 1–2 workers were counted at bait set in the crotch of a tree at a height of 5 m.

Winged reproductives were collected at lights at 9 pm on December 15 and 8 pm on March 11. Additionally, winged reproductives were taken from the stomach of a *Eleutherodactylus portoricensis* female on June 25. Smith (1936) found a "large number of winged queens in a nest on March 20 and males on April 5", indicating swarming may occur over an extended time period.

Wolcott (1948) indicated that these "ants form an appreciable item in the food of three species of lizards" and I found some in stomachs of a female *Anolis gundlachi* and a male *A. krugii*. Additionally, *Eleutherodactylus coqui*, *E. portoricensis*, *E. richmondi*, *E. wight-*

mannae and *Leptodactylus albilabris* utilize them as food in Luquillo Forest.

Anochetus mayri Emery: The extremely small colonies of *A. mayri*, usually consisting of approximately a dozen workers, are common throughout Puerto Rico in the soil under dead leaves and stones and in decaying stumps and logs (Wheeler, 1908; Smith, 1936).

Although I encountered no foraging workers in Luquillo Forest, one colony was discovered in a pith chamber of a decaying limb of *Cecropia peltata* in the forest litter. The colony contained 1 queen, 3 eggs, 8 larvae, 14 pupae and 22 workers.

Workers were collected in the palm forest on El Yunque (elev. 753 m) within the stomachs of *Eleutherodactylus brittoni* juveniles. Additionally, an occasional worker was found in the stomachs of *E. portoricensis*, *E. richmondi*, *E. eneidae*, *E. wightmannae*, *E. antillensis* and *Anolis gundlachi*, but no large numbers were consumed. Workers also were dissected from the stomachs of *Eleutherodactylus coqui* juveniles collected in a wet pasture 2 miles east of Rio Grande, near the coast.

Amblyopone sp.: The first record of a species of *Amblyopone* occurring in Puerto Rico was that of Drewry (1967) who found winged forms in a light trap within the forest near El Verde Field Station on September 24, 1965. Subsequently, I recovered workers from the stomach of a juvenile *Eleutherodactylus richmondi* collected in the same locale. However, no foraging workers were observed and the noticeable absence of this species from the stomach of frogs, feeding at the litter level, would seem to indicate that this species is rare.

Trachymesopus stigma (Fabricius): Individual workers and portions of colonies of *T. stigma* were encountered in various locations throughout Luquillo Forest from the lower reaches to the mossy forest (elev. 998 m) on the slopes of El Yunque Peak. This species is attracted to decaying fruits and I found workers crawling on the fruiting bodies of *Andira inermis*, *Guarea trichilioides* and *Micropholis garciniaefolia*. Portions of colonies, lacking a queen, were found under rocks, under decaying boards and in rotten logs. A complete colony was discovered on July 2, 1970, housed among the aerial roots of a large tree. Several chambers of varying sizes had been carved out of the decaying soft wet wood. The colony consisted of 1 queen, 51 workers, 9 larvae, 99 pupae, 13 female and 2 male winged reproductives. On the same date, part of a second colony was discovered utilizing five *Cecropia peltata* pith chambers. It contained 42 larvae, 105 pupae, 39 workers, 27 female and 4 male winged reproductives, but no queen was found. Winged female reproductives were also collected from chambers within a rotten log on July 15. Smith (1936)

reported finding winged males and females in nests on October 1 and November 20.

The workers do not appear to be subjected to intense predation, presumably because of their habit of foraging singly. The remains of individual ants were dissected from the stomachs of the lizard, *Anolis gundlachi*, and the frogs *Eleutherodactylus coqui*, *E. portoricensis*, *E. karlschmidti*, *E. richmondi* and *E. wightmannae* in Luquillo Forest. Additional workers were collected from stomachs of *E. richmondi* males taken in Maricao Forest.

Hypoponera opacior (Forel): The only previous Puerto Rican record for this species was that of Smith (1936), who collected some individuals in mountains 14 Km east of Mayaguez.

In Luquillo Forest, no colonies or foraging workers were observed. However, a few individuals were collected from the stomachs of *Eleutherodactylus coqui*, *E. wightmannae* and *E. locustus*.

Hypoponera ergatandria (Forel): In Luquillo Forest, *H. ergatandria* workers have been collected only at tunafish bait stations on the side of a bank formed by a roadcut through the mossy forest on El Yunque Peak (elev. 998 m). In the same locale, workers were collected from stomachs of *Eleutherodactylus locustus* males, females and juveniles on May 22 and June 8, 1970. Attempts to locate colonies of this nocturnal species were unsuccessful.

I wish to express my appreciation to my wife Freda and to Dr. George Drewry for the many hours they spent with me in the forest at night collecting frogs. I should also like to thank Dr. Drewry for identifying the frogs and lizards and Mr. Alejo Estrada for identifying the forest plants utilized by the ants. I would like also to express appreciation to Dr. Richard Clements for providing the support and facilities of the Puerto Rico Nuclear Center. Ant identifications were made or verified by Dr. David R. Smith, Systematic Entomology Laboratory, ARS, USDA. I should also like to thank Dr. Smith for critically reviewing this manuscript.

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NOTE

NEOTYPE DESIGNATION FOR HEBRUS SOBRINUS UHLER (HETEROPTERA: HEBRIDAE)

In an earlier note (1975, Proc. Entomol. Soc. Wash. 77(1):128), I pointed out that Uhler described *Hebrus sobrinus* twice in the same year, and that the description based on specimens from Denver (April 30, 1877, Bull. U.S. Geol. Geog. Surv. Terr. 3(2):452) has priority over the description based on specimens from New Mexico (June or later 1877, Ann. Rept. Chief Eng. for 1877:1330. "Wheeler Report"). In the same note, I established a lectotype female for the "New Mexico" specimens, and pointed out that the "Denver" type-material had not yet been located; a continued search has not been fruitful.

As two species of *Hebrus* (*bucnoi* and *sobrinus*) occur at Denver and type-material cannot be found for Uhler's "Denver" *sobrinus*, the taxonomic status of the species is uncertain. It is desirable that the Denver and New Mexico forms be maintained as conspecific, hence I have selected a winged male from Denver, Colorado, (CL2, IV–17–'61, J. T. Polhemus, in U.S. National Museum) as a neotype for Uhler's Denver species. It is conspecific with my lectotype of Uhler's New Mexico *sobrinus*. A label has been added "Neotype, *Hebrus sobrinus* Uhler, April 1877, J. T. Polhemus."

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